

## Transforming Functions (Extended) Solutions

Qn	Answer	Note
1	Curve A has the equation $y = -x^2$	Accept $y = -(x^2)$
2	Curve B is $y = x^2 + 20$	Allow for poor reading of the scale (eg $y = x^2 + 19$ )
3	Curve C is $y = -x^2 - 20$	See note above
4	B becomes D after stretching by a factor of a in the x-direction (where a is actually $\sqrt{2}$ )	Accept "reasonable values of a (eg 1.5) and follow through Q6 and Q7 with it
5	Curve D is $y = 0.5x^2 + 20$	
6	Curve E is $y = -0.5x^2 - 20$	
7	2 lines of symmetry and order of rotational symmetry of 2	Would be nice if students sketched the logo and the lines of symmetry
8	$(x-3)^2 \equiv x^2 - 6x + 9$ $\Rightarrow y = x^2 - 6x + 11 = (x-3)^2 + 2$	Or similar
9	$y = (x-3)^2 + 2$ has a minimum point at (3, 2)	
10	$A(1, 6) \rightarrow A'(9, 6)$	
11	$B(3, 2) \rightarrow B'(7, 2)$	
12	$P(x, y) \rightarrow P'(10-x, y)$	
13	Ahmed gets $y = (10-x)^2 - 6(10-x) + 11$ $\Rightarrow y = 100 - 20x + x^2 - 60 + 6x + 11$ $\Rightarrow y = x^2 - 14x + 51$  And the curve drawn has a domain $5 \leq x \leq 10$	Allow follow through from answer to Q12
14	Delinda is thinking of a horizontal translation of the curve by 4 units to the right	Accept $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$
15	Delinda gets: $y = (x-4)^2 - 6(x-4) + 11$ $\Rightarrow y = x^2 - 8x + 16 - 6x + 24 + 11$ $\Rightarrow y = x^2 - 14x + 51$ (i.e. the same as Ahmed)	
16	Reflection in the line $y = 6$	
17	Here, $P(x, y) \rightarrow P'(x, 12-y)$ $\Rightarrow 12-y = x^2 - 6x + 11$ $\Rightarrow y = -x^2 + 6x + 1$	Some students might get here by multiple transformations – give credit if appropriate